In the Claims

1. (currently amended) A faceted polyhedron molecule ~~or a polymeric structure~~ comprising polygon moieties and linking moieties, wherein said polygon moieties comprise edges and vertices, wherein a first polygon moiety is attached to a second polygon moiety by at least one of said linking moieties, and wherein said at least one linking moiety is attached to a vertex of said first polygon moiety and a vertex of said second polygon moiety; wherein the faceted polyhedron molecule is a discrete macromolecule.

2. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 1, wherein said at least one linking moiety is a coordinating ligand or a bridging ligand.

3. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 2, wherein said first polygon moiety and said second polygon moiety each comprise a metal, and wherein said linking moiety is a coordinating ligand.

4. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 3, wherein said coordinating ligand is attached to said vertex of said first polygon moiety and said vertex of said second polygon moiety through covalent interactions.

5. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 3, wherein said coordinating ligand is a multifunctional carboxylate ligand.

6. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 5, wherein said multifunctional carboxylate ligand is a bifunctional carboxylate ligand.

7. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 6, wherein said bifunctional carboxylate ligand is benzene-1,3-dicarboxylate.

8. (currently amended) The ~~polymeric structure~~ faceted polyhedron molecule of claim 1, wherein said linking moiety is a trifunctional carboxylate ligand.

9. (currently amended) The ~~polymeric structure~~ faceted polyhedron molecule of claim 8, wherein said trifunctional carboxylate ligand is 1,3,5-benzene tricarboxylate.

10. (canceled)

11. (canceled)

12. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 1, wherein said linking moiety subtends an angle of about 90° between the planes occupied by said first and second polygon moieties.

13. (currently amended) The ~~polymeric structure~~ faceted polyhedron molecule of claim 1, wherein said linking moiety subtends an angle greater than about 90° between the planes occupied by said first and second polygon moieties.

14. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 1, wherein said linking moiety subtends an angle of about 120° between the planes occupied by said first and second polygon moieties.

15. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 1, wherein said linking moiety subtends an angle of about 144° between the planes occupied by said first and second polygon moieties.

16.(currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 1, wherein at least one of said first and second polygon moieties comprises a non-metal.

17. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 1, wherein said first or second polygon moiety can sustain 3-fold rotational symmetry.

18. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 1, wherein said first or second polygon moiety can sustain 4-fold rotational symmetry.

19. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 1, wherein at least one of said first and second polygon moieties comprises a transition metal.

20. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 19, wherein said transition metal is in a 2+ transition state.

21. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 19, wherein said first and said second polygon moieties each comprise transition metals.

22. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 19, wherein said first and second polygon moieties each comprise transition metals, and wherein said transition metals are not in the same transition state.

23. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 18, wherein said transition metal is not in a 2+ transition state, and wherein said faceted polyhedron molecule further comprises a counterion that may or may not be coordinated to said transition metal.

24. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 1, further comprising a solvent molecule.

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25. (currently amended) The faceted polyhedron molecule ~~or polymeric structure~~ of claim 1, further comprising a solvent molecule selected from the group consisting of methanol, ethanol, I-propanol, dimethylformamide, and acetonitrile.

26. (canceled).

27. (canceled)

28. (currently amended) A compound comprising a faceted polyhedron molecule ~~or polymeric structure~~, wherein said faceted polyhedron molecule ~~or polymeric structure~~ comprises polygon moieties and linking moieties, wherein said polygon moieties comprise edges and vertices, wherein a first polygon moiety is attached to a second polygon moiety by at least one of said linking moieties, ~~and~~ wherein said at least one linking moiety is attached to a vertex of said first polygon moiety and a vertex of said second polygon moiety; and wherein the faceted polyhedron molecule is a discrete macromolecule.

Claims 29-53 (canceled).

54. (currently amended) ~~The~~ A faceted polyhedron molecule or polymeric structure ~~of claim 1~~ comprising polygon moieties and linking moieties, wherein said polygon moieties comprise edges and vertices, wherein a first polygon moiety is attached to a second polygon moiety by at least one of said linking moieties, wherein said at least one linking moiety is attached to a vertex of said first polygon moiety and a vertex of said second polygon moiety; and wherein said faceted polymeric molecule or polymeric structure is $[(L)(S)Cu_2(bdc)_2]_{12}$ or $[(S)\,Cu_2\,(bdc)_2]_{12}$, wherein L is pyridine, S is methanol, and bdc is benzene-1,3-dicarboxylate.

55. (canceled)

56. (New) A faceted polyhedron molecule or polymeric structure comprising polygon moieties and linking moieties, wherein said polygon moieties comprise edges and vertices, wherein a first polygon moiety attached to a second polygon moiety by at least one of said linking moieties, wherein said at least one linking moiety is attached to a vertex of said first polygon moiety and a vertex of said second polygon moiety, wherein said at least one linking moiety is a coordinating ligand or a bridging ligand, and wherein at least one of said first and second polygon moieties comprises a non-metal moiety and said linking moiety is a bridging ligand.

57. (New) The faceted polyhedron molecule or polymeric structure of claim 56, wherein said bridging ligand is a multifunctional molecular moiety capable of sustaining multiple supramolecular interaction.

58. (New) A faceted polyhedron molecule or polymeric structure comprising polygon moieties and linking moieties, wherein said polygon moieties comprise edges and vertices, wherein a first polygon moiety attached to a second polygon moiety by at least one of said linking moieties, wherein said at least one linking moiety is attached to a vertex of said first polygon moiety and a vertex of said second polygon moiety, and wherein said first polygon moiety comprises a non-metal and said second polygon moiety comprises a non-metal.

59. (New) The faceted polyhedron molecule or polymeric structure of claim 58, wherein said first polygon moiety comprises a non-metal and second polygon moiety comprises a non-metal, wherein the vertices of said first and second polygon moieties are connected by a bridging ligand.